

3.12 Rock Crusher

3.12.1 General Description of Source Category

LANL will utilize a 150 ton per hour impact rock crusher to crush concrete and rock removed from buildings as part of the Laboratory's decontamination and decommissioning (D&D) efforts. The crusher will be used intermittently when material is available for crushing and will aid in volume reduction of construction debris. Prior to crushing, all material is carefully screened and sampled to determine if radioactive contamination is present. If contamination values are above defined release criteria, the material is considered radioactive and properly disposed of as radioactive waste and will not be crushed. The material that is crushed will be used as fill at the sites where the D&D activities occur, thereby eliminating transportation and disposal issues.

The crusher is powered by a 200 hp Detroit Diesel engine and is run at 100 hp and 1,000 rpm as per operating specifications. It is portable and will be moved to various D&D sites within LANL's boundaries and will be used to crush concrete and rock at the site where the demolition occurred. The crusher is currently located at Technical Area 21 (TA-21).

Currently, the rock crusher is not operational and will only be used to crush contaminated materials. Therefore, it will occasionally be necessary for LANL to contract this operation to outside contractors. LANL will require any contractors bringing rock crushing equipment onto the site to provide a copy of their current air permit from the New Mexico Environment Department and demonstrate they are in compliance with all applicable Air Quality control requirements including 40 CFR 60, Subpart OOO.

LANL obtained construction permit No. 2195 under 20.2.72 NMAC. The permit was issued on June 16, 1999, however NMED has granted an extension of the initial startup date to June 16, 2004.

3.12.2 Operating Schedule

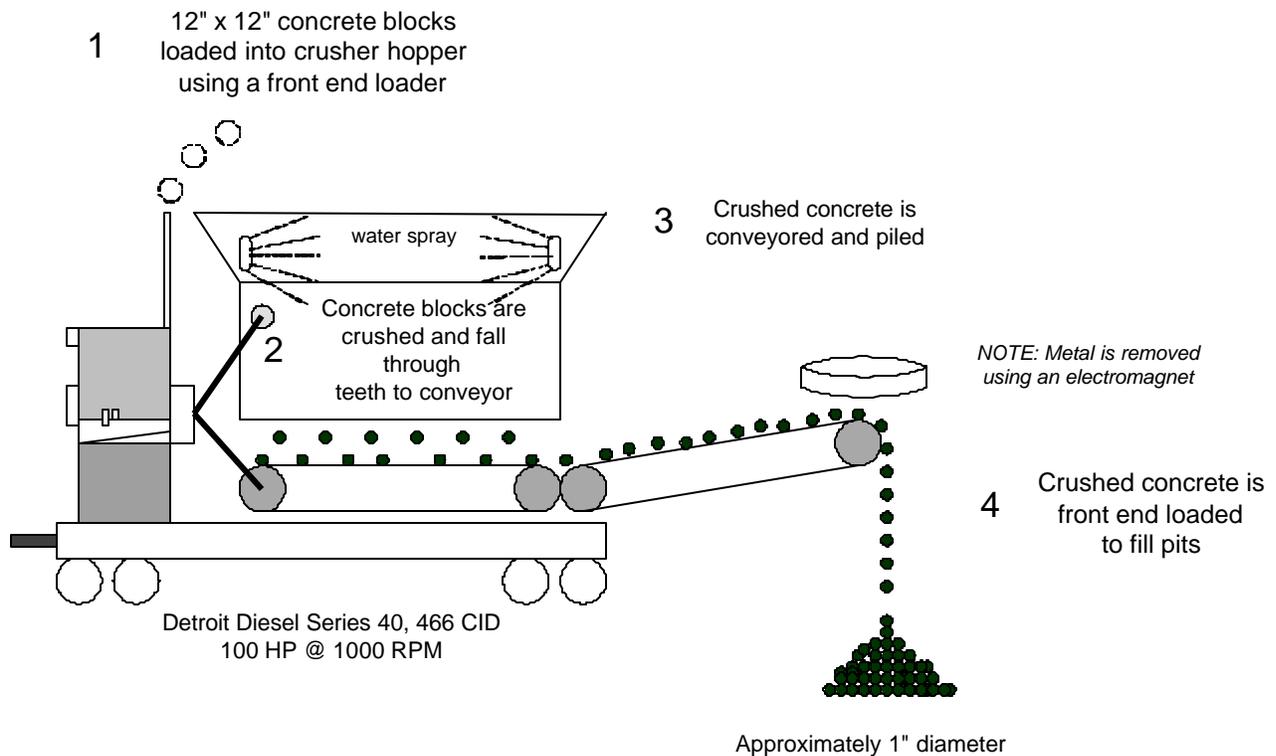
The rock crusher is permitted to operate a maximum of 2,080 hours per year. The

processing rate will not exceed 150 tons per hour. The crusher is restricted to operate 8 hours per day, 6 days per week, 4 weeks per month, and 12 months per year. The crusher may only operate during daylight hours. Operations may be performed on weekends.

3.12.3 Process Flow Diagram

A flow diagram for the operation of the rock crusher is provided in Figure 3.12-1.

Figure 3.12-1. Process Flow Diagram for Rock Crusher



3.12.4 Emissions

There are two sources of emissions from the rock crusher: the diesel engine exhaust and emissions from the crushing operation. Table 3.12-1 presents the permitted emission limits for rock crushing operations based on the operating parameters of construction Permit No. 2195 of 2,080 hours per year at 150 tons per hour with a 200 hp diesel engine.

Table 3.12-1. Emissions Estimates for LANL Rock Crusher

Pollutant	Diesel Engine ^(a)	Crushing Operations ^(b)	Total Emissions
	(ton/yr)	(ton/yr)	(ton/yr)
NO _x	6.4	--	6.4
SO _x	0.4	--	0.4
CO	1.4	--	1.4
TOC	0.5	--	0.5
TSP (uncontrolled)	0.5	6.2	6.7
TSP (controlled)	0.5	0.5	1.0
PM ₁₀ (uncontrolled)	0.5	3.0	3.4
PM ₁₀ (controlled)	0.5	0.3	0.7
HAP	9.6E-03	--	9.6E-03

(a) Emission factors for the diesel engine are from AP-42, 10/96, Section 3.3, Gasoline and Diesel Industrial Engines, Tables 3.3-1 and 3.3-2.

(b) Emission factors for rock crushing are from AP-42, 01/95, Section 11.19.2, Crushed Stone Processing, Table 11.19.2-2.

Sample emission calculations are shown below:

$$Emission\ Rate\ (Engine)\left(\frac{ton}{year}\right) = Emission\ Factor(EF)\left(\frac{lb}{hp - hr}\right) * hp\ rating * \left(\frac{ton}{2000\ lb}\right) * Operating\ Hours\left(\frac{hours}{year}\right)$$

$$Emission\ Rate\ (Crushing)\left(\frac{ton}{year}\right) = Emission\ Factor\left(\frac{lb}{ton}\right) * Process\ Rate\left(\frac{ton}{hour}\right) * \left(\frac{ton}{2000\ lb}\right) * Operating\ Hours\left(\frac{hours}{year}\right)$$

The emission factors used in the above calculations are provided in the following tables. TSP is assumed to be equivalent to PM₁₀ for engines based on a footnote to Table 3.3-1 in AP-42 which states that “PM₁₀ = particulate matter less than or equal to 10 μm aerodynamic diameter. All particulate is assumed to be ≤1 μm in size”.

Table 3.12-2. Emission Factors for Diesel Engines (AP-42, Tables 3.3-1 and 3.3-2)

Pollutant	lb/hp-hr
NO _x	0.031
CO	0.00668
SO _x	0.00205
PM ₁₀	0.0022
TOC	0.00247
HAP	4.6E-05

Table 3.12-3. Emission Factors for Handling and Crushing (AP-42, Table 11.19.2-2)

Activity	Uncontrolled		Controlled	
	TSP ^(a) (lb/ton)	PM ₁₀ (lb/ton)	TSP ^(a) (lb/ton)	PM ₁₀ (lb/ton)
Crusher Loading	0.000042	0.00002	0.000042	0.00002
Crushing-Wet	0.0050	0.0024	0.0012	0.00059
Screening ^(b)	0.032	0.015	0.0018	0.00084
Conveyor	0.0029	0.0014	0.00010	0.000048
Load & Fill	0.00021	0.0001	0.00021	0.0001
TOTAL	0.040	0.019	0.0034	0.0016

- (a) In the 1995 Version of AP-42, Section 11.19.2 controlled and uncontrolled emission factors are provided for PM₁₀ for each process. Footnotes to the table specify that the PM₁₀ values should be multiplied by 2.1 to estimate TSP.
- (b) The crusher at LANL does not have a screening operation. Crushed material is gravity fed through a funnel-shaped exit point. Material that does not fit through the funnel is further crushed until all material exits the unit. Emissions from screening are included to provide worst case emission estimates.

3.12.5 Emissions Control Equipment

The rock crusher is equipped with a water spray system for emission control of particulate matter during loading, conveying and crushing. Based on the April 1995 edition of AP-42, Section 11.19.2-2, this method of dust suppression for the crushing operation will achieve a 92% control efficiency.

3.12.6 Applicable Requirements

Applicable requirements can be found in the following table. They represent permit conditions from Permit No. 2195 issued under 20.2.72 NMAC, as well as requirements under 20.2.61 NMAC, Smoke and Visible Emissions, and 20.2.7 NMAC, Excess Emissions.

Table 3.12-4. Applicable Requirements for Rock Crushers

Source Category	Applicable Requirements
LANL Rock Crusher	<p><i>Operating Requirements:</i></p> <ul style="list-style-type: none"> The process rate shall not exceed 150 tons per hour. (Condition 1.e of Permit 2195) Operation is restricted to daylight hours, not to exceed 8 hours a day, 6 days a week, 4 weeks a month, 12 months a year. (Condition 1.f of

Source Category	Applicable Requirements
	<p>Permit 2195)</p> <ul style="list-style-type: none"> • Crusher must be at least 150 meters from the LANL boundary. (Condition 1.g of Permit 2195) • A compliance test to measure particulate emissions shall be conducted within 60 days of initial startup. (Condition 7 of Permit 2195) • The hours of operation shall not exceed 2080 hours/year (Condition 1.b of Permit 2195) <p>Emission Limits:</p> <ul style="list-style-type: none"> • Opacity shall not exceed 15% from crushing operations or 10% from transfer points, conveyors, screens, feedbins and stockpiles. Truck traffic areas shall be watered to minimize dust emissions when operations located 200 meters or less from LANL boundary. (Condition 2.a of Permit 2195) • The diesel engine shall not exceed opacity of 20 percent. (20.2.61.108 NMAC) • NO_x emissions from the diesel generator shall not exceed 6.2 lb/hr and 6.4 tons per year (12-month rolling average). (Condition 2.b of Permit 2195) • CO emissions from the diesel generator shall not exceed 1.3 lb/hr and 1.4 tons per year (12-month rolling average). (Condition 2.c of Permit 2195) • VOC emissions from the diesel generator shall not exceed 0.5 lb/hr and 0.5 tons per year (12-month rolling average). (Condition 2.d of Permit 2195) • SO₂ emissions from the diesel generator shall not exceed 0.4 lb/hr and 0.4 tons per year (12-month rolling average). (Condition 2.e of Permit 2195)

3.12.7 Proposed Monitoring, Recordkeeping, and Reporting

Recordkeeping and reporting requirements are presented in the following table. Required recordkeeping and reporting are followed with a citation for the basis of the requirement.

Table 3.12-5. Proposed Monitoring, Recordkeeping, and Reporting for the Rock Crushers

Source Category	Monitoring, Recordkeeping, and Reporting
LANL Rock Crusher	<p>Monitoring:</p> <ul style="list-style-type: none"> • A compliance test to measure particulate emissions shall be conducted within 60 days of initial startup. (Condition 7 of Permit 2195)

Source Category	Monitoring, Recordkeeping, and Reporting
	<p>Recordkeeping:</p> <ul style="list-style-type: none"> • Daily records of hours and days of operation, production rates, horsepower, and frequency of water application shall be kept. (Condition 3 of Permit 2195) <p>Reporting:</p> <ul style="list-style-type: none"> • Notify the Air Quality Bureau within 15 days of equipment substitution and relocation of the rock crusher outside the LANL boundary. (Conditions 1.d, 4.a, 4.b, 4.c, 5, and 6 of Permit 2195, and 20.2.72.202 NMAC) • Notify the Air Quality Bureau of the anticipated date of initial startup of the rock crusher no less than 30 days prior to startup. (Condition 4.d of Permit 2195) • Notify the Air Quality Bureau of the actual date of initial startup of the crusher within 15 days after the startup date. (Condition 4.e of Permit 2195) • Submit to NMED the compliance test protocol at least one week prior to the anticipated pre-test meeting date. (Condition 7.a of Permit 2195) • Submit two copies of the compliance test results to NMED within 30 days after completing the compliance test. (Condition 7.c of Permit 2195) • Report criteria pollutant and HAP emissions on a semiannual basis. (20.2.73.300 NMAC for criteria pollutants and LANL proposed condition for HAPs and semiannual basis) • Submit semiannual report of any required monitoring within 45 days from the end of each reporting period. The reporting periods are January to June and July to December. (20.2.70.302(E)(1) NMAC)